CUSTOMER NO. 46850 *PATENT*

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re: Attorney Docket No. Liu 25-18-17-7

In re application of: Xiang Liu, Lothar Benedict Erhard Josef Moeller, Xing Wei, and Chongjin Xie

Serial No.:	10/730,413	Group Art Unit:	2613
Filed:	12/08/2003	Examiner:	Pascal, Leslie C.
Matter No.:	990.0506	Phone No.:	571-272-3032

For: Duobinary Receiver

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Applicants request review of the final rejection in the above-identified application. No amendments are being filed with this request. This request is being filed with a notice of appeal. The review is requested for the reasons stated in the following Remarks section.

REMARKS

Claims 1-24 are pending in the application. Claims 1-3, 5-13, 15-22, and 24 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Moeller-022 (U.S. Patent Application Publication No. 2003/0170022). Claims 4, 14, and 23 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Moeller-022 in view of Yonenaga. Claims 1, 3-11, 13-21, and 23 are also provisionally rejected on the ground of obviousness-type double patenting over claims 1, 3-4, 6-7, 11, 13-14, 21, and 23 of co-pending Application No. 10/782,231.

Claim 1 is directed to a method of signal processing having the steps of: (A) converting an optical signal into an electrical signal having an amplitude corresponding to optical power of the optical signal; and (B) sampling the electrical signal using a sampling window to generate a bit sequence corresponding to the optical signal. The sampling window has a width. The electrical signal has a series of waveforms comprising first and second pluralities of waveforms. Each waveform of the first plurality represents a binary "0" and each waveform of the second plurality represents a binary "1." Each waveform is **integrated over the sampling window width** to generate an integration result. The integration result is compared with a decision threshold value to generate a corresponding bit value. The sampling window **width** is **selected** to be less than a bit length in the electrical signal in order **to reduce contribution** of the second plurality of waveforms into integration results corresponding to the first plurality of waveforms.

In the rejection of claim 1, on pages 5-6 of the final office action dated 04/24/2008, the Examiner cites and relies on Figure 4 of Moeller-022. More specifically, on page 5, the Examiner states that "Moeller discloses ...each sampling point in Fig. 4 has its own finite width." On page 6,

the Examiner further states that "integration is implied in the decision circuit 240." For the following reasons, the Applicants respectfully disagree with this characterization of Moeller-022.

Inspection of Moeller-022 reveals that it describes its processing method by consistently and repeatedly using the phrases like "sampling **point**" and "signal is sampled at [a] **point**" (see, e.g., paragraphs [0024] and [0027]). Nowhere does Moeller-022 use the phrase "integrated over the sampling window width" or the terms "integrated" and "sampling window." Yet, the Examiner somehow concludes that Moeller-022 teaches or reasonably suggests integrating a signal over a sampling window.

As known in the art, the term "sampling" refers to a process of converting a continuous signal into discrete data. The term "point sampling" designates a process of obtaining a value of the continuous signal at a particular fixed instant (i.e., point) in time. Although technical limitations of a real-life electronic circuit usually cause it to have a finite time resolution, an electronic circuit adapted for "point sampling" is normally designed to generate signal samples that approximate the ideal point samples as closely as practically possible. The latter means that the characteristics of the electronic circuit are chosen so that the signal does not significantly change while a sample of the signal is being generated by the electronic circuit.

In contrast, an electronic circuit adapted for signal integration is designed to generate a signal sample that represents an integral of the signal over a time interval, and not just a point sample of the signal. A typical purpose of integrating a signal is to obtain its average value over the sampling-window duration or to smooth out undesirable (e.g., noise-induced) signal fluctuations. This means that the duration of the sampling window is normally chosen so that the signal is able to change or fluctuate significantly within the sampling window. Clearly, **sampling** a signal **at a point** and **integrating** a signal **over a** sampling **window** are two **very different** signal processing techniques because the former aims at obtaining a snap-shot of the signal while the latter allows the signal to evolve while being measured. It is therefore submitted that the Examiner's view that signal integration can be implied from point sampling of the signal is in error.

For all these reasons, it is submitted that the Examiner's contention that Moeller-022 teaches or reasonably suggests the limitation of "each waveform is integrated over the sampling window width to generate an integration result" is unfounded and improper. It is therefore submitted that Moeller-022 does not provide an adequate basis for, and therefore cannot support, the conclusion of obviousness with respect to this limitation of claim 1.

On page 6 of the final office action, the Examiner admits that "Moeller does not expressly disclose: the sampling-window width is selected to reduce contribution of the second plurality of waveforms into integration results corresponding to the first plurality of waveforms." However, the Examiner proceeds to state that "such a selection of sampling window width is intuitively obvious." The Examiner then provides the following rationale for this conclusion:

> One of ordinary skill in the art would have been motivated to do this in view of an obviously undesirable counterexample. That is, consider the option of a sampling window that is as wide as the bit slot. With such a wide sampling window, the "1" waveforms of pulses with timing jitter from adjacent bit slots can adversely contribute to the integration results corresponding to "0" waveforms. This contribution can lead to inaccurate sampling results. Accordingly, it follows that one would be motivated to select a sampling window width to reduce this contribution.

In response, the Applicants note that the Examiner's **rationale** is improperly **biased and incomplete** because it only considers the possible benefits of using a relatively narrow sampling window while completely ignoring the possible detriments of such use. In particular, as explained

at page 5 of Applicants' specification, a relatively wide sampling window and the corresponding relatively long integration time produce noise averaging, which is beneficial because it might lead to fewer decoding errors. The flip side of this observation is that a relatively narrow sampling window and the corresponding relatively short integration time can be detrimental because they reduce the benefits of noise averaging. It is submitted that one of ordinary skill in the art would certainly recognize and consider these detriments. With the recognition of both the benefits and the detriments of using a relatively narrow sampling window, it would not at all be obvious to one of ordinary skill in the art that the benefits would outweigh the detriments, notwithstanding the Examiner's assertion to the contrary.

In the advisory action of 07/08/2008, the Examiner counters this argument by stating that the Supreme Court decision in KSR International Co. v. Teleflex Inc. "rejected a rigid application of the 'teaching, suggestion, or motivation' test" and that "it is well known to avoid jitter by using a sampling window smaller than the bit period, the benefits out[weigh] the detriments. The applicant has not explained why it would not have been obvious." In addition, the Examiner states that her rationale for determining obviousness is not an "obvious to try" rationale.

The Applicants parse these Examiner's statements as follows. The Examiner thinks that the burden of proving non-obviousness is on the Applicants. The Examiner's rationale for determining obviousness is neither a teaching-suggestion-motivation (TSM) rationale nor an obvious-to-try (OTT) rationale. The Examiner bases the substance of her rationale on jitter considerations.

To address these points, the Applicants first note that MPEP § 2142 provides that "The examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness. If the examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of nonobviousness." MPEP § 2141(III) further provides that:

> The proper analysis is whether the claimed invention would have been obvious to one of ordinary skill in the art after consideration of **all the facts**... If the search of the prior art and the resolution of the *Graham* factual inquiries reveal that an obviousness rejection may be made using the familiar teaching-suggestion-motivation **(TSM) rationale**, then such a rejection **should be made**. Although the Supreme Court in *KSR* cautioned against an overly rigid application of TSM, it also recognized that TSM was one of a number of valid rationales that could be used to determine obviousness... The key to supporting any rejection under 35 U.S.C. 103 is the **clear articulation** of the reason(s) why the claimed invention would have been obvious. The [Supreme] Court quoting *In re Kahn*, ... stated that '**[R]ejections** on obviousness **cannot be sustained by mere conclusory statements**...' [Emphasis added.]

Based on these provisions, the Applicants submit that the Examiner has not carried her initial burden of factually supporting the conclusion of obviousness because she did **not** consider **all the facts** as required by the MPEP. In particular, the Examiner did not consider the detriments of using a relatively narrow sampling window. Furthermore, the Examiner considered only one possible signal impediment, i.e., jitter, while completely ignoring other possible impediments. In fact, it is quite puzzling that the Examiner chose to focus on the effects of jitter because (1) neither the claim language nor Applicants' specification mentions jitter and (2) Applicants' specification clearly considers the effects of dispersion, thermal noise, and spontaneous beat noise (see, e.g., Applicants' Fig. 4B and page 6, lines 6-23). The above-quoted Examiner's statement that "it is well known to avoid jitter by using a sampling window smaller than the bit period, the benefits out[weigh] the detriments" cannot possibly sustain the conclusion of obviousness because (1) it is

a **naked conclusory statement** that lacks clear articulation of the reasons and (2) it exemplifies the very essence of what the MPEP deems **impermissible** in obviousness-type rejections.

The Applicants further submit that the Examiner's **rationale** underlying the rejection of claim 1 under 35 U.S.C. § 103(a) is **unclear** and unidentifiable. More specifically, the Examiner did not use the TSM rationale. In view of the clear, affirmative MPEP command to use the TSM rationale whenever possible, the Examiner's failure to use this rationale means either that the cited art does not support it or that the Examiner did not follow proper procedures. The Examiner, by her own admission, did not use the OTT rationale. It appears that the Examiner did not use any of the exemplary rationales enumerated in MPEP § 2141(III) because most of them require either "predictable results" or "predictable solutions." As previously explained by the Applicants, it was impossible to predict the results of the method defined by claim 1 without extensive experiments and/or numerical simulations, the results of some of which are presented in Applicants' Figs. 6-8. The sheer amount of this effort strongly supports a finding that these results were not *a priori* predictable. While MPEP § 2141(III) states that the rationales enumerated therein do not form an all-inclusive list, it still requires "clear articulation of the reason(s) [and therefore the rationale of] why the claimed invention would have been obvious." Clearly, the Examiner failed to apply the proper legal standard and/or follow proper procedures mandated by the MPEP in concluding that the limitation of "the sampling window width is selected to be less than a bit length in the electrical signal in order to reduce contribution of the second plurality of waveforms into integration results corresponding to the first plurality of waveforms" is obvious over Moeller-022.

For all these reasons, the Applicants submit that the Examiner erred in her rejection of claim 1 under 35 U.S.C. § 103(a) and that claim 1 is non-obvious and allowable over Moeller-022. For similar reasons, the Applicants submit that each of claims 11, 21, and 24 is also non-obvious and allowable over Moeller-022. Since the rest of the claims depend variously from claims 1, 11, and 21, it is further submitted that those claims are also allowable over Moeller-022. The Applicants submit therefore that the rejections of claims under § 103 have been overcome.

In paragraph 7 of the final office action, the Examiner accepts the previously submitted arguments with regard to the double-patenting rejection. However, the Examiner still fails to withdraw this rejection. The Applicants reiterate their position regarding the obviousness-type double patenting rejection over a co-pending application (Serial No. 10/782,231) and submit that the obviousness-type double patenting rejection in the present application should be withdrawn under MPEP § 804(I)(B)(1) because the present application is "the earlier filed of the two pending applications."

In view of the above remarks, the Applicants believe that all pending claims are in condition for allowance. Therefore, the Applicants believe that the entire application is now in condition for allowance, and early and favorable action is respectfully solicited.

Respectfully submitted,

Date: 07/24/2008
Customer No. 46850
Mendelsohn & Associates, P.C.
1500 John F. Kennedy Blvd., Suite 405
Philadelphia, Pennsylvania 19102

/Yuri Gruzdkov/
Yuri Gruzdkov
Registration No. 50,762
Attorney for Applicant
(215) 557-8544 (phone)
(215) 557-8477 (fax)